

THE *ULYSSES* SPECIES-GROUP, GENUS *HAEMOLAE LAP S*  
(ACARINA, LAELAPIDAE).

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(Fifteen Text-figures.)

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*Synopsis.*

The following stages of a complex of three species of *Haemolaelaps* parasitic on Australian marsupials are described—the female of *H. penelope*, n. sp., from *Trichosurus caninus* (Phalangeridae); the female, male and deutonymph of *H. ulysse s* Domrow from *Pseudocheirus laniginosus* and *Schoinobates volans* (Phalangeridae); and the female, male and deutonymph of *H. telemachus*, n. sp., from *Antechinus flavipes* and *A. stuarti* (Dasyuridae).

Since Strandtmann's fine work (1949) on the American species of *Haemolaelaps* Berlese, three important keys to the Laelapinae have been published: Strandtmann and Wharton (1958), Tipton (1960) and Zumpt and Till (in Zumpt *ed.*, 1961). The three species discussed below key out to *Haemolaelaps* in all of them. Further, they fit Till's later (1963) and broader concept of *Androlaelaps* Berlese (including *Haemolaelaps*) in all aspects, even to the typical formulae given for the pedal and palpal setation.

From Till's key, since femora II in the female have only simple setae on their ventral surface, the present species would fall in *Haemolaelaps* s.s., the type species of which—*H. marsupialis* Berlese, 1910, from an Australian marsupial bandicoot (Peramelidae)—has been well redescribed by Keegan (1956) with *camera lucida* figures from the Berlese collection in Florence. Womersley (1955, 1958) and Domrow (1961, 1963) have since described a further four species in the *marsupialis* species-group, all except one of which are parasites of Australian marsupials.

The characters which might exclude the present species from *Haemolaelaps* s.s. are fourfold. Firstly, seta *s*<sub>3</sub> on the dorsal shield is regularly absent. Secondly, the anterior seta on coxae II and III is expanded and hyaline in two of them (yet normal in the third). Thirdly, the femora and trochanters of the legs may bear one or two apically notched setae. Fourthly, one of the palpal trochanteral setae is foliate (as, incidentally, in *Andreacarus petersi* Radford, see Clifford and Keegan, 1963). However, Till (1963) lists many setal types for *Androlaelaps* s.l., and it therefore still seems preferable, at this stage, to place the following three species in *Haemolaelaps*. They may be assigned to the *ulysses* species-group.

*Key to species of ulysse s species-group (genus Haemolaelaps).*

- |                                                                                                   |                            |
|---------------------------------------------------------------------------------------------------|----------------------------|
| 1. Adults .....                                                                                   | 2.                         |
| Deutonymphs .....                                                                                 | 6.                         |
| 2. Females .....                                                                                  | 3.                         |
| Males .....                                                                                       | 5.                         |
| 3. Anterior seta on coxae II and III normal, filiform. On <i>Trichosurus caninus</i> ..           | <i>penelope</i> , n. sp.   |
| Anterior seta on coxae II and III expanded, hyaline .....                                         | 4.                         |
| 4. Larger species, idiosoma 810-850 $\mu$ long in type series, and about 900 $\mu$ in series from |                            |
| <i>S. volans</i> . Anal shield only slightly wider than long. Anterodorsal seta on trochanter     |                            |
| IV apically notched. First taken from <i>Pseudocheirus laniginosus</i> , and three times          |                            |
| since on <i>Schoinobates volans</i> .....                                                         | <i>ulysses</i> Domrow.     |
| Smaller species, idiosoma 660-700 $\mu$ long. Anal shield decidedly wider than long. Antero-      |                            |
| dorsal seta on trochanter IV normal. Many records from <i>Antechinus</i> .....                    |                            |
| .....                                                                                             | <i>telemachus</i> , n. sp. |

5. Dorsal shield with distinct lateral bands of longitudinal striae. Holoventral shield with four pairs of usurped ventral setae; sternal, metasternal and genital setae reaching far beyond insertions of subsequent pair. Terminal body setae far exceeding outline of body ..... *ulysses* Domrow.  
Dorsal shield without definite lateral bands of longitudinal striae. Holoventral shield with three pairs of usurped ventral setae; sternal, metasternal and genital setae not reaching beyond insertions of subsequent pair. Terminal body setae scarcely exceeding outline of body ..... *telemachus*, n. sp.
6. Anterior half of dorsal shield with 15 or 16 pairs, and posterior half with 20 pairs of setae. Metasternal setae on sternal shield. Anal shield as wide as long .... *ulysses* Domrow.  
Anterior half of dorsal shield with 21 pairs, and posterior half with 16 or 17 pairs of setae. Metasternal setae off sternal shield. Anal shield wider than long .... *telemachus*, n. sp.

HAEMOLAE LAP S PENELOPE, n. sp. (Figs 1-3).

*Type Material*.—Holotype female and three paratype females from the mountain brush-tailed possum, *Trichosurus caninus* (Ogilby) (Phalangeridae), rainforest 2000', Mt. Glorious, S.E. Queensland, 7.xi, 13.xi and 6.xii.1962, I. D. Fanning and R.D. Holotype in National Insect Collection, CSIRO, Canberra; paratypes in School of Public Health and Tropical Medicine, Sydney, and QIMR.

*Female*.—Idiosoma 775-825 $\mu$  long, almost entirely covered by dorsal shield. Posterior half of shield, as well as anterolateral margins, reticulate, but anterior half of disc virtually textureless. Forty pairs of short setae and numerous paired pores (including one very strong posterolateral pair) present. Marginal cuticle without setae.

Sternal shield preceded by striate cuticle; surface generally with stippled punctae, but few weak striations in anterolateral corners beyond SI. Three pairs of short subequal setae and two pairs of pores on shield. Metasternal setae and pores free in cuticle. Genital shield expanded behind coxae IV, with anterolateral margins sinuous and posterior margin ever so slightly concave. Surface marked with striae as figured. Genital setae on shield, and three pairs of ventral setae very near (occasionally touching) lateral margins (pattern of setae on right hand side typical). Anal shield wider than long, marked anterolaterally, and with anus slightly in front of centre. Adanal setae set near centre of anus, rather weaker than postanal seta. Crigrum present. Metapodal shields elongate, bean-shaped, with minute sclerotization in from anterior angle. Ventral cuticle with about 40 pairs of setae, the posterior ones quite spinose. Peritremes reaching forward almost to anterior margin of coxae I. Peritremal shield not extended posteriorly far behind stigmata, nor fused to exopodal shield IV.

Legs. Coxal formula 2.2.2.1, all setae slender and unexpanded. Anterodorsal margin of coxa II with weak process. Bifurcate setae present dorsally on same segments as in *ulysses* except trochanter IV, where all setae are simple.

Gnathosoma essentially as in *ulysses*.

HAEMOLAE LAP S ULYSSES Domrow (Figs 6-10).

*Haemolaelaps ulysses* Domrow, 1961, Proc. Linn. Soc. N.S.W., 86: 63, figs 3-5.

*Material Examined*.—From the greater glider-possum, *Schoinobates volans* (Kerr) (Phalangeridae), twenty-one females, Brindabella Range, Australian Capital Territory, xi.1961, J. H. Calaby; nine females, Glenaladale, 23 m. W Bairnsdale, Victoria, 7.ix.1962, R. M. Warneke; eighteen females, thirteen males and one deutonymph, Cumberland, E of Marysville, Vic., 25.ix.1963, R.M.W. (The type series is from another phalangerid, the ring-tailed possum, *Pseudocheirus laniginosus*,\* Victoria.)

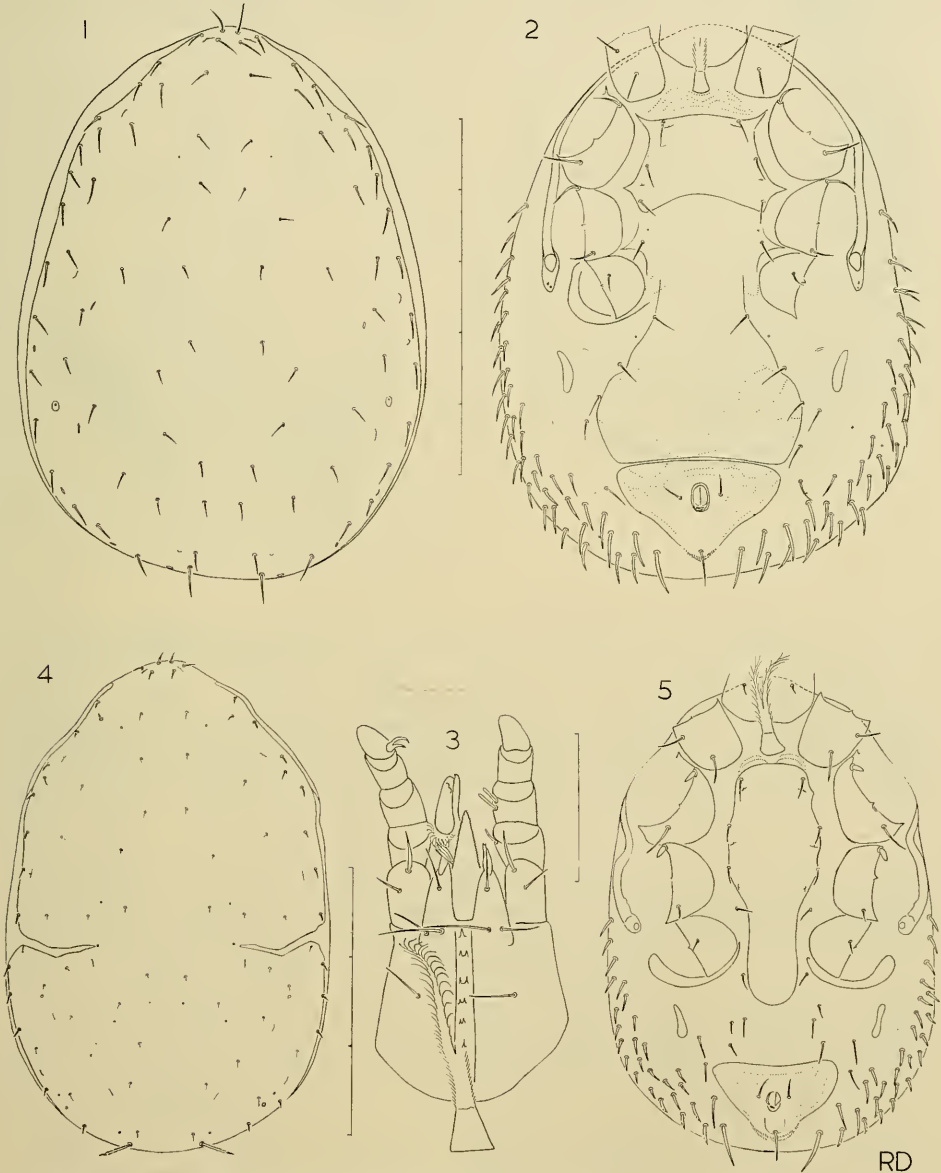
*Female*.—Strip of dorsal shield between marginal and submarginal setae (i.e. about one-sixth of total width on each side) reticulate, but not closely and longitudinally striate as in male; markings stronger from vertex to shoulders, weaker laterally, but

\* This latter possum is also the type host of *Trichosurolaelaps striatus* Domrow, 1958, eight females of which were likewise present on the specimen of *S. volans* from Cumberland. Similar double infestations have been noted on two *S. volans* at Esk, Qld., 8.ii.1964, R.D., I.D.F and J. S. Welch.

extending back almost to subterminal pair of setae. Disc virtually textureless. Distinct pore present posterolaterally in position shown for male.

Sternal shield with weak reticulation anterolaterally between pores I and margin. Two zones of long curved striae between sternal shield and tritosternal base. Palpal femur with truncate, distally hyaline seta similar to pair shown on inner face of genu.

My original statement "femora I & II without elongate setae dorsally" is misleading—two such setae are present on each of these segments, but they are also apically bifurcate and therefore treated later in the same paragraph. Femur III and



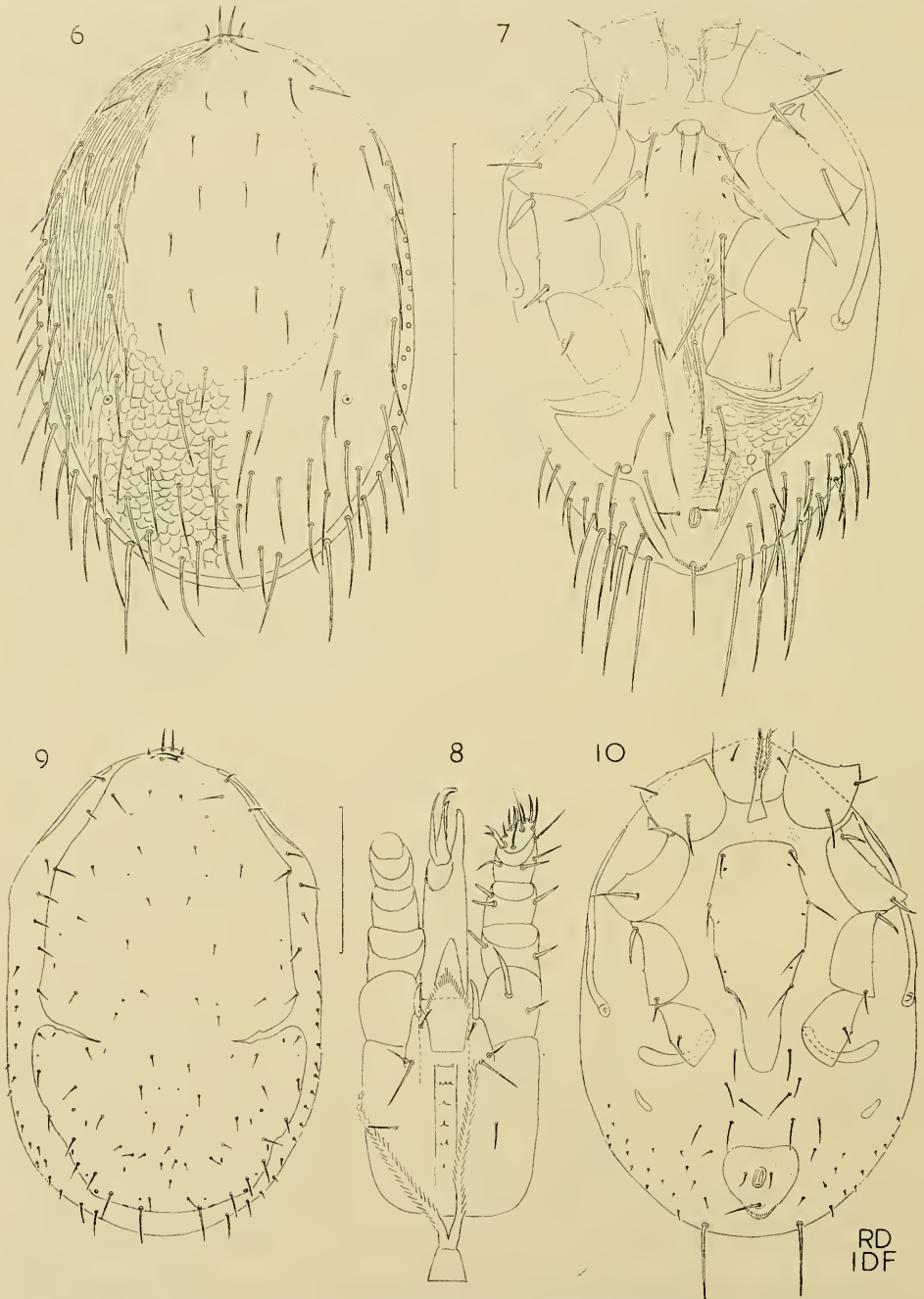
Text-figs 1-3.—*Haemolaelaps penelope*, n. sp. Female.—1 and 2, Dorsal and ventral surfaces of idiosoma; 3, Ventral surface of gnathosoma.

Text-figs 4-5.—*Haemolaelaps telemachus*, n. sp. Deutonymph.—Dorsal and ventral surfaces of idiosoma. (Each division on the scales = 100 $\mu$ .)



trochanter IV each bear one, and femur IV two such setae dorsally. The remainder of the leg setation, apart from the anterior seta on coxae II and III, is normal.

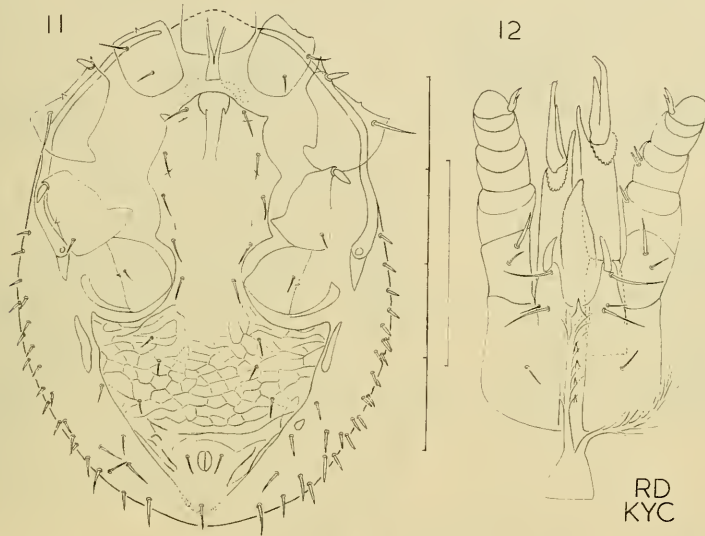
*Male*.—Idiosoma of nine specimens 759–825, av. 790 $\mu$  long. Dorsal shield with areas of three differing textures—anterolateral band closely and longitudinally striate; mid-



Text-figs 6-10.—*Haemolaeps ulysses* Domrow. 6-8, Male; 9-10, Deutonymph.—6 and 7, Dorsal and ventral surfaces of idiosoma; 8, Ventral surface of gnathosoma; 9 and 10, Dorsal and ventral surfaces of idiosoma. (Each division on the scales = 100 $\mu$ .)

anterior virtually textureless; mid-posterior with reticulate striae. Very strong pore posterolaterally, and many weaker ones elsewhere. Dorsal setae arranged in 40 pairs, much stronger than in female, especially posteriorly. Dorsal marginal cuticle with about sixteen pairs of setae increasing in length posteriorly.

Holovenral shield with reticulate striae as figured. Genital aperture just in front of SI, preceded by zone of striate cuticle. Sternal, metasternal and genital setae very much stronger than in female, with SI barely half as long as remainder. Three pairs of sternal and metasternal pores present. Ventral area expanded behind coxae IV, with slender usurped setae arranged 4·4 (4·3 in one specimen). An unpaired fenestration appears posterolaterally in ventral area of one mite, and two paired ones (as



Text-figs 11-12.—*Haemolaelaps telemachus*, n. sp. Male.—11, Ventral surface of idiosoma; 12, Ventral surface of gnathosoma. (Each division on the scales = 100 $\mu$ .)

figured) in another. Anal area much as in female. Metapodal shields absent. Peritremes extending forward almost to anterior margin of coxae I. Peritremal shields very weak, not at all extended posteriorly to meet exopodal shields IV, which latter in some specimens appear to fuse with holovenral shield between coxae IV. Ventral cuticle with about 20 pairs of slender setae, posterior pairs particularly long.

Leg setation, including bifurcate setae, essentially as in female.

Gnathosoma also essentially as in female. Basal segment of chelicerae about one-third of total length. Central segment with virtually edentate fixed digit and trace of corona. Third segment comprising weak movable digit, which is virtually obscured by longer, seemingly tubular spermatophore-carrier.

*Deutonymph*.—Idiosoma 714 $\mu$  long. Dorsal shield virtually textureless, incised midlaterally. Anterior half with fifteen setae on one side and sixteen on other; posterior half with 20 pairs of setae, posterior discals being unevenly arranged. System of paired pores present. Marginal cuticle with about 20 pairs of setae. Peritremes as in female.

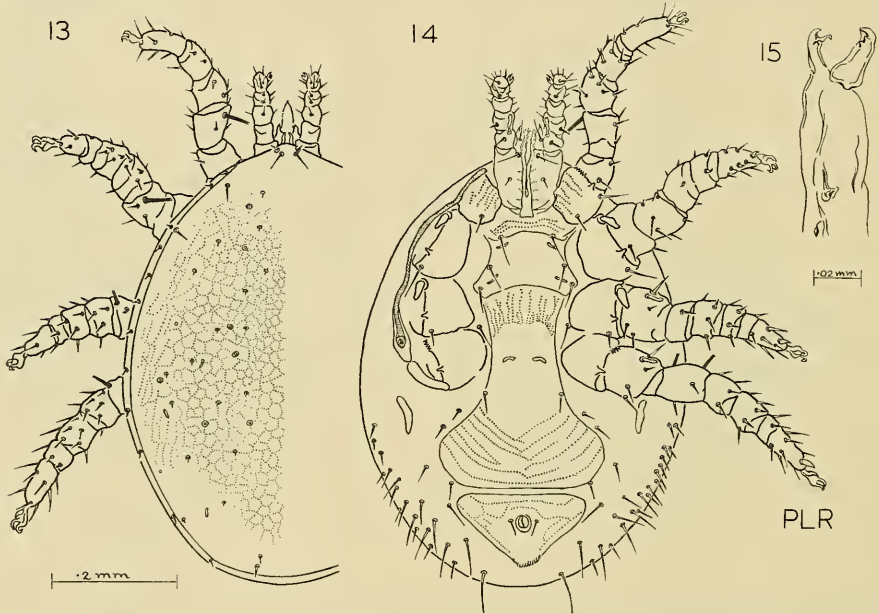
Sternal shield extending from anterior margin of coxae II to posterior margin of coxae IV; narrower, ligulate in posterior third; faintly striate. Four pairs of slender setae and three pairs of pores (sternal and metasternal series) present on shield. Future genital pair free in cuticle between coxae IV, and followed by two rows of four similar setae. Anal shield rather more rounded, but much as in female. Meta-

podal shields present. Ventral cuticle with about fifteen pairs of small setae, and one pair of very strong setae posteriorly.

Legs and gnathosoma essentially as in female.

HAEMOLAELAPS TELEMACHUS, n. sp. (Figs 4, 5, 11-15).

*Type Material*.—Holotype female, allotype male, four paratype females, three paratype males and one morphotype nymph, Glenlofty, Victoria, 15.vii.1962, R. M. Warneke, from the yellow-footed marsupial mouse, *Antechinus flavipes* (Waterhouse) (Dasyuridae).



Text-figs 13-15.—*Haemolaelaps telemachus*, n. sp. Female.—13 and 14, Dorsal and ventral surfaces; 15, Chelicera in lateral view. (Scales as indicated.) (Except for one point, I have not retouched these figures in any way. The dorsal shield actually takes in all the setae shown on the marginal cuticle. Three pairs of vertical setae are present as is usual, and an additional two pairs, whose bases I have indicated by circles, are normally present in the submarginal series. The metasternal and anal complexes are detailed in the text. Coxa II with process on anterodorsal margin. Outer posterior hypostomal setae present.)

Also four paratype females, Ben Nevis, Vic., 20.iii.1962, A. L. Streefkeck; two paratype females, 8 m. from Buchan, Buchan-Bruthen Road, Vic., 11.iv.1962, R.M.W.; thirteen paratype females and three paratype males, Tommy's Bend, 6 m. E Marysville, Vic., 20.v.1962, R.M.W.; one paratype female, Cathedral Range, Vic., 17.vi.1962, R.M.W.; seven paratype females, Timbarra, Vic., 15.iv.1963, R.M.W.; and one paratype female, Murrumbateman, N.S.W., 26.v.1962, R.M.W., all from *A. stuarti* Macleay.

Holotype and allotype NIC; paratypes British Museum (Natural History), U.S. National Museum, SPHTM and QIMR.

*Female*.—Idiosoma 660-700 $\mu$  long, almost entirely covered by dorsal shield. Shield striate anterolaterally, but disc marked with punctae in distinct hexagonal pattern; also with regularly arranged system of pores. Thirty-eight pairs of setae normally present on shield; discals extremely weak.

Sternal shield preceded by biconvex striations, virtually textureless except for striae in extreme anterolateral angles. Anterior margin convex, posterior margin concave; with usual six setae and four pores. Metasternal complex represented by



seta, pore and shieldlet. Genital shield greatly expanded behind coxae IV, rectilinear posteriorly; with one pair of genital setae and striations in characteristic chevron arrangement. Anal shield wider than long, striate except behind anus; cribrum present. Anus centrally placed, flanked by adanal setae, and followed by postanal seta twice as strong as adanals. Elongate metapodal shields present. In addition to three pairs closely flanking genital shield, ventral cuticle with about 22 pairs of setae, which are more spinose than figured. Peritremes reaching forward to anterior margin of coxae I; peritremal shield not fused to exopodal shield IV.

Legs. Coxal formula 2.2.2.1, anterior seta on coxae II and III expanded and hyaline, as is one seta on trochanters III and IV. Coxa II with small spinose process on anterodorsal margin. Femora I-IV with one, and femur IV with two apically notched setae dorsally. Seta on anterodorsal face of trochanter IV normal. Other leg setation undistinguished except for one or two stronger setae on tarsi II-IV.

*Male*.—Idiosoma 528–550 $\mu$  long. Dorsum as in female. Holovenal shield striate only on expanded ventral area behind coxae IV. Intercoxal area with usual five pairs of setae and three pairs of pores. Ventral area with three pairs of usurped setae. Anal area as in female, but postanal seta relatively weaker. Ventral cuticle with about 26 pairs of spinose setae.

Legs and gnathosoma essentially as in female. Deutosternum with five single denticles. Fixed digit of chelicerae obsolescent. Spermatophore-carrier slightly curved distally, somewhat longer than movable digit.

*Deutonymph*.—Idiosoma 550 $\mu$  long. Dorsal shield of same texture as adult, but incised midlaterally. Anterior half with 21 pairs of setae; posterior half with 16–17 pairs, terminal pair strongest.

Sternal shield textureless. Anterior half wider, bearing six setae and six pores; posterior half evenly ligulate, flanked by four setae. Ventral cuticle with about 32 pairs of spinose setae.

Otherwise essentially as in female.

#### Acknowledgements.

I am most grateful to Dr. Winifred M. Till for her comments, to Dr. Phyllis L. Robertson for Figs 13–15, and to Messrs. I. D. Fanning and Koong Yue Cheong for their assistance with some of the others. Figs 11 and 12 were prepared while I was on leave at the Institute for Medical Research, Kuala Lumpur, supported by U.S. Public Health Service Research Grant AI-03793-03 (formerly E3793) from the National Institute of Allergy and Infectious Diseases. Mrs. J. W. Phillips and Miss B. Nolan have typed my manuscript with their usual care.

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*Corrigenda.*

I am grateful to Mr. R. M. Warneke, who is working on the genus *Antechinus*, for allocating many animals previously assigned to *A. flavipes* to their proper place. The following corrections to mite hosts are necessary in three earlier papers in these PROCEEDINGS. Throughout Vol. 80, Part 3, pp. 201-6 (1956), read *A. stuarti* for *A. flavipes*. In Vols. 86, Part 1, p. 71 (1961) and 88, Part 2, p. 214 (1963), the marsupial mice from Nambour, Mt. Glorious, Pearl Beach, Picton, Tuggolo, Gelantipy, Mt. Clay, Ben Nevis, Buchan and Cathedral Range are all *A. stuarti*, not *A. flavipes*.